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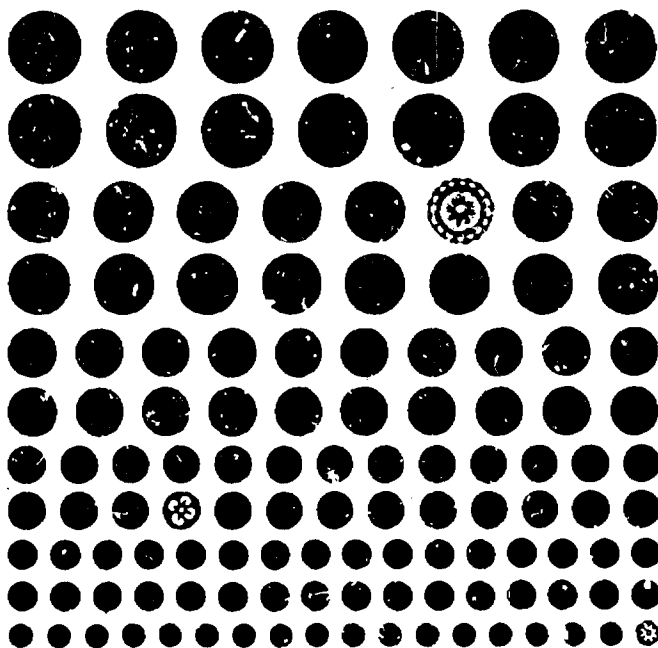
ABSTRACT

This annotated list of Educational Testing Service research reports includes 1) investigations in which creativity is the major subject of the study, 2) ones in which creativity is a variable, and 3) studies concerned with the development of methods or instruments for use in creativity research. Included are studies, or phases of studies, completed during the period 1953 to June 1970, as well as studies in progress. Completed studies cover the areas of literature reviews, characteristics of task and context, characteristics of the creative product, characteristics of the creative person, prediction of creativity, and correlates of creativity. The reports are indexed by both title and author. (DE)

ED050133



RESEARCH ON
creativity:



AN ANNOTATED LIST OF
RELEVANT ETS REPORTS
1953-1970

EDUCATIONAL TESTING SERVICE, PRINCETON, N.J.



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INTRODUCTION

This annotated list of ETS research reports includes investigations in which creativity is the major subject of study, as well as investigations in which creativity is a variable.

Studies which are concerned with the development of methods or instruments for use in research on creativity, such as those concerned with the evaluation of art products and the construction of the Independent Activities Questionnaire, are also included. These studies supply background information for the investigations in which these methods and instruments are employed.

Literature reviews and discussions of concepts and theories are included that provide an overview of the thinking and findings of researchers in creativity.

Included in the list are studies, or phases of studies, completed during the period 1953 to June 1970, as well as studies in progress. No reports are available for the latter; single copies of the former are available as long as the supply lasts. References are provided at the end of the abstract for those reports that have been published as journal articles.

Additional copies of this publication are available on request from:

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COMPLETED STUDIES

LITERATURE
REVIEWSCreativity: A Literature Survey

This literature survey includes all publications on the subject of creativity that appeared in the psychological literature during the period from 1944 through 1952, both those of a descriptive-discursive character and those of a research nature, excluding only the publications of either type that pertained entirely to the artistic kind of creativity. It also has a section which suggests leads for further research.

Naomi Stewart
RM 53-08

The Biographical Information Blank as a Predictor of Student Achievement: A Review

A review of literature dealing with the use of biographical information blanks (BIB) among student populations. The studies are considered under the four criterion areas of scholastic grades, creative achievement, persistence in school, and vocational or curriculum choice. Substantial areas of disagreement in application and utility of the BIB as a predictor remain based upon choice of educational criteria and the content of the BIB itself.

N. Freeberg
RB 66-51; published in Psychological Reports,
1967, 20, 911-925.

Creativity Tests: What Do They Really Measure?

This article discusses definitions of creativity in terms of three major measurement strategies, namely, those focusing on the characteristics of 1) the creative process, 2) the creative person, and 3) the creative product. The limitations of current approaches to assessment are also discussed.

S. P. Klein
Paper presented at the annual national conference of the Association for Higher Education in Chicago, Illinois, on March 7, 1967; published in Journal of the National Art Education Association, 1967, 20, 23-24.

LITERATURE
REVIEWS
(continued)

Creativity

A summary of recent efforts to understand the sources and vicissitudes of creativity in terms of studies of 1) eminent or unusual people; 2) the creative process; 3) the Freudian theory of the resolution of neurotic sexual conflicts; 4) the growth and development of creative ability; 5) attempts to encourage creativity; and 6) the distribution of intellectual abilities and the structure of intellect.

Response properties, judgmental standards, and esthetic responses for four criteria of creativity are reviewed, together with the personal qualities and cognitive styles that may match the response properties.

P. W. Jackson and S. J. Messick RM 67-2;
published in P. London and D. Rosenhan (Eds.),
Foundations of Abnormal Psychology. New York:
Holt, Rinehart and Winston, 1968. Pp. 226-250.

CHARACTERISTICS OF TASK AND CONTEXT Modes of Thinking in Young Children: A Study of the Creativity-Intelligence Distinction

This volume is concerned with the empirical validation of a distinction between intelligence and creativity as modes of cognitive functioning and with an elucidation of possible personality and cognitive correlates of individual differences in these modes. Considerable importance was attached to the social-psychological context within which assessment of creativity is carried out. It was felt that such assessment proceeds best in a play situation, in a setting characterized by temporal freedom, rather than in one resembling the evaluative and time-limited setting in which intelligence is tested. By developing a homogeneous set of creativity tasks and by administering them in a game-like evaluation-free context, it was possible to achieve a statistical differentiation between creativity and conventional intelligence measures in elementary school children. Differences in children's thinking styles were also studied in relation to characteristics of their behavior in school and play settings.

M. A. Wallach and N. Kogan
New York: Holt, Rinehart and Winston, 1965,
357 pp.

Task and Motivational Influences on the Assessment of Creative and Intellective Ability in Children

This study was designed to test two major hypotheses: 1) that game-like contexts will induce higher creativity levels than will test-like contexts, and 2) that in game-like contexts, creative and intellective performance will be unrelated to each other, whereas in test-like contexts, these two kinds of performance will be positively related. A total of 104 fifth-grade children (52 males and 52 females) in four separate classrooms participated in the study. Two of the classrooms were assigned to the game-like condition and the other two to the test-like condition. Two creativity tasks of an associative type and a vocabulary test were administered. Kuhlmann-Anderson IQ scores were available for almost all subjects.

No clearcut superiority for test- or game-like contexts in reference to creativity level was observed. Rather, effects varied dependent upon the task, the criterion of creativity, anxiety and defensiveness levels of subjects, and the sex of the subject.

With regard to the second hypothesis, overall correlational differences were not found. However, when test

CHARACTERISTICS
OF TASK AND
CONTEXT
(continued)

anxiety was employed as a moderator variable, results consistent with the hypothesis were obtained for boys.

N. Kogan and F. T. Morgan
RB 67-29; published in Genetic Psychology
Monographs, 1969, 80, 91-127.

Context Effects in the Assessment of Creative Ability in Young Children

The two major aims of this investigation were 1) the exploration of the variations in creative ability associated with variations in assessment conditions, in motivational characteristics of subjects, and in the interaction between the two; and 2) the comparison of test-like and game-like contexts in the degree to which creative and intellectual performance are related.

The subjects used in this study were 104 children, 52 boys and 52 girls, in the fifth grade of the public schools of a small town of less than 50,000 population. The large majority of the children could be classified as of work- and lower-middle-class background.

The children were randomly assigned to the test-like and the game-like treatments. For the test-like group, the examiner's instructions were intended to create considerable apprehension: the instruments were described as tests, the experimenter was introduced as a member of the school hierarchy, the children were given to understand that their performance would be evaluated by school officials, and psychological time pressures were induced. For the game-like group, every effort was made to relieve the subject of apprehension: the instruments were presented as games, the experimenter was dissociated from the school hierarchy, and the importance of the time factor was diminished.

Two creativity tasks developed by Wallach and Kogan -- alternate uses and pattern meanings -- were employed. The subjects also filled out a self-report inventory which included scales of general and test anxiety and defensiveness. Several scores were derived from the two creativity tasks, including number and uniqueness of responses, number of different categories of usage for a specific item (spontaneous flexibility), and repetition across items.

The results of this study provide some evidence that to the extent that a fluency criterion for creativity is used, the test-like context is more conducive to eliciting creativity

CHARACTERISTICS
OF TASK AND
CONTEXT
(continued)

than is the game-like context. However, if number of categories (spontaneous flexibility) is considered a more suitable creativity criterion, the game-like situation is more effective in eliciting creativity. Defensiveness was found to be a distinct inhibitor of performance in boys, though not in girls.

N. Kogan

In K. J. Genkamp (Ed.) Developments in Educational Testing, Vol. 1, London: University of London Press, 1969, pp. 310-319.

Evaluation of the Education Through Vision Curriculum --
Phase I

The Education Through Vision art curriculum was developed under the direction of Bartlett Hays, Jr., of Phillips Academy. It employs audiovisual instructional materials and classroom activities designed to develop visual acuity in students and teachers, present problems focused on principles involved in the learning process rather than on the "products" resulting from that process, and stimulate areas of creativity through the correlation of studio work with intellectual and emotional activities.

This evaluation study, conducted in 11 participating high schools, had as its primary purpose the identification of variables on which the curriculum had a significant effect. A secondary purpose was the determination of achievement levels in various areas of course content.

Tests in field independence, expressional fluency, length estimation, originality, semantic redefinition, visualization, figural adaptive flexibility, semantic spontaneous flexibility, and ability to interpret metaphor were administered to curriculum participants and nonparticipating comparison groups. Measures of verbal and mathematical ability were administered for sample description and covariance adjustment.

Education Through Vision classes did not exhibit gain significantly greater on the nine cognitive variables than that of the comparison classes. An analysis of curricular strengths and weaknesses indicated that student achievement was relatively high in areas corresponding closely to stated curriculum objectives.

Further research is recommended, with possible investigation of other sets of variables, greater uniformity

CHARACTERISTICS of curriculum, and modification of the curriculum for
 OF TASK AND presentation to students at lower age levels.
 CONTEXT
 (continued)

Donald A. Trismen
 Final Report, Project No. 7-0049
 Grant No. OEC-1-7-070049-0161
 U.S. Office of Education, Bureau of Research
 Available from: Bureau of Research
 U.S. Office of Education
 Room 3123
 200 Maryland Avenue, S.W.
 Washington, D. C. 20202

Creativity and Environmental Cues in Nursery School Children

Three creativity tests, each requiring the child to name as many ideas as he could that met a simple problem requirement, were administered to 53 nursery school children. Two of these tests were given in a typically barren experimental setting, and served as a basis for dividing the sample into creative and uncreative subjects. The third was given to some subjects under the same cue-poor conditions, but to others in a cue-rich testing environment -- a room containing objects and pictures which provided cues to possible responses.

Creativity and environmental richness interacted significantly in their effect on ideational production. Creative children gave more responses in a rich than in a poor environment, while uncreative subjects showed no overall effect for environmental cues. It is argued that scanning the environment for task-relevant information is one of the strategies employed by the creative child in his search for problem solutions. This interaction also shows that, despite low test intercorrelations, the creativity dimension has some stability across tests and over a period of several months in nursery school children.

W. C. Ward
 RB 68-58; published in Developmental Psychology,
 1969, 1, 543-547.

Anxiety and Learning to Formulate Hypotheses

This study investigated some effects of a training procedure on production of original responses and the relationship of such behavior to personality and ability measures. The results indicate that 1) the training procedure increased

CHARACTERISTICS OF TASK AND CONTEXT (continued) the quantity but not the quality of the ideas produced; 2) this increase did not transfer to a similar task involving divergent production; 3) test anxiety had consistent curvilinear relationships with performance, poor performance being associated with an intermediate level of test anxiety; and 4) there was a significant interaction of anxiety and verbal ability. Some implications of these results for testing, teaching, and prediction are discussed.

S. P. Klein, N. Frederiksen, and F. R. Evans
RB 68-63

Orff-Schulwerk: Design for Creativity
A Report of the Project, Creativity and Participation in Music Education

The final report submitted to the U. S. Office of Education by the Bellflower School District summarizes a two and one-half year research and pilot teaching program in six school districts of Los Angeles County. The major emphasis of this project was the adaptation and use of the Orff-Schulwerk approach to music education in the primary and elementary school program. There are specific content objectives in this approach, but creativity and spontaneity are referred to as its central purposes.

The report summarizes the research and developments that produced the adaptation of Orff-Schulwerk for use in the public school instructional program.

Section III describes the evaluation conducted by Educational Testing Service. The seven objectives of the project were assessed by a variety of newly developed scales utilizing observers' ratings as well as children's performance and self-report. The Children's Individual Test of Creativity (CITOC) by Metfessel, Burns, and Foster was used as the basic measure of creativity. The CITOC was designed to assess creativity according to the dimensions of the divergent thinking domain suggested by Guilford's model of the structure of intellect.

The findings suggest that changes in creativity (as measured by these assessments) may not be observed during or at the end of one year. However, significant differences may be observed after two or more years of such an instructional program.

J. R. Harsh
Available from Bellflower Unified School District
in Bellflower, California.

CHARACTERISTICS OF TASK AND
CONTEXT
(continued)

A Clarification of Cropley and Maslany's Analysis of the
Wallach-Kogan Creativity Tests

This paper discusses the discrepancies between the findings of the Cropley and Maslany study and those of the Wallach-Kogan research. It also describes a method of analysis which would resolve these discrepancies.

N. Kogan
RM 70-03

CHARACTERISTICS
OF THE CREATIVE
PRODUCT

Dimensions for Evaluating Art Products

Faculty at a school of design assigned a drawing problem to 191 student artists. Seven expert judges evaluated the drawings on three dimensions: 1) general preference, 2) technical facility, and 3) "involvement." The correlations between the average ratings on each dimension were .91, .95, and .97. The reliability of the preference ratings was .92. It was concluded that an assessment of a drawing's quality was not improved by separately considering dimensions other than simple preference.

S. P. Klein, R. W. Skager, and C. B. Schultz
RB 66-9

Points of View About Preference as Tools in the Analysis of Creative Products

This research originated in an investigation of the feasibility of evaluating artistic products for the study of creativity. Drawings by 191 sophomore students at a school of design were rated for esthetic quality by 28 artist and non-artist judges to determine 1) whether more than one point of view about quality is held among a heterogeneous group of judges, and 2) whether personality, academic, and background characteristics of the students relate differentially to quality as defined by different points of view.

Four points of view about quality were identified. Psychological, achievement, and background characteristics of students were found to be differentially related to the quality of their drawings as defined by the four points of view. In particular, choice of major, scores on certain aptitude tests, academic performance in the fine arts courses, and measures of wealth of cultural background showed differential correlations with the points of view.

R. W. Skager, C. B. Schultz, and S. P. Klein,
Perceptual and Motor Skills, 1966, 22, 83-94.

Spontaneity vs. Deliberateness as a Dimension of Esthetic Judgment

The authors' previous research indicated that there were two major viewpoints among experts as to what constituted quality in a drawing. It was hypothesized that these viewpoints were related to the distinction between "spontaneous"

CHARACTERISTICS OF THE CREATIVE PRODUCT (continued) and "deliberate" drawing styles. To investigate this hypothesis, 80 drawings rated high and low by the experts holding each viewpoint were sorted into "spontaneous" or "deliberate" piles by laymen who were given two brief paragraphs defining "spontaneous handling" and "deliberate handling."

The analysis of the ratings indicated that the "spontaneous" viewpoint was highly sensitive to the difference between "spontaneous" and "deliberate" handling, but that the "deliberate" point of view was not: "spontaneity vs. deliberateness" appeared to be a way of describing the key dimension on which the "spontaneous" judges evaluated the quality of the drawings. The "deliberate" judges, on the other hand, appeared to base their evaluations on a dimension (or a group of dimensions) that was relatively unrelated to spontaneity vs. deliberateness. The findings suggest that laymen could easily adopt an orientation from the brief definitions of the two categories that would permit them essentially to replicate the esthetic judgments of highly trained experts.

S. P. Klein and R. W. Skager
 RB 66-14; published in Perceptual and Motor Skills, 1967, 25 161-168.

The Multidimensional Scaling of a Set of Artistic Drawings: Perceived Structure and Scale Correlates

Product-centered research on creativity uses the analysis of tangible products such as art objects, writing, or scientific achievement as creativity referents. In this evaluation and study of drawings by sophomore students at the Rhode Island School of Design, multidimensional scaling was applied to similarity judgments by art experts on two separate sets of 25 drawings.

Three similarity dimensions accounted for the inter-stimulus distances for each set of drawings. Although no statistical test was available, the dimensions from the two sets appeared to correspond. Scale values of 4 drawings common to the two sets were consistent, and the dimensions appeared to define very similar stimulus characteristics. It was concluded that multidimensional scaling procedures provided a means for differentiating among a set of complex, esthetic products.

Scale values of drawings on the three dimensions also correlated differentially with cognitive and achievement

CHARACTERISTICS OF THE CREATIVE PRODUCT (continued) measures available on the students, suggesting that product dimensions identified via similarity judgments were related to characteristics of individuals producing the products. Hypotheses were developed as to the psychological meaning of the three product dimensions.

R. W. Skager, C. B. Schultz, and S. P. Klein
RB 66-21; published in Multivariate Behavioral Research, 1966, 1, 425-426.

For other studies using students' art products, see:

Measuring Artistic Creativity and Flexibility, pages 15-16.

The Prediction of Academic Success and the Ability to Draw at a School of Design, page 20.

CHARACTERISTICS
OF THE CREATIVE
PERSON

What College Teachers Value in Students

The author's own summary of findings in his studies showing relations between faculty ratings of student characteristics and reference qualities such as scholastic aptitude, academic proficiency, and general desirability. Faculty members at eight institutions rated samples of students on 16 traits covering five areas: intellectual qualities, characteristic approach to work, character traits and values, peer relationships, and social style and personal adjustment.

In general, ratings revealed that students scoring high on the Scholastic Aptitude Test were described by faculty as high in "academic performances," "intellectual curiosity" and "creativity." Good academic performance did not lead to a judgment of the student as ethical, cooperative, altruistic, or self-insightful. There was strong evidence that the major component of desirability is academic performance.

J. A. Davis, RB 64-10, RB 64-11, RB 64-12,
RB 64-13, RB 65-12, RB 66-28; summarized in
College Board Review, 1965, No. 56, 15-18.

A New Look at the Creativity-Intelligence Distinction

The authors suggest that creativity essentially involves 1) the production of abundant and unique associative content and 2) the presence in the associator of a playful, permissive task attitude. To test this hypothesis, 151 fifth-grade children were asked to generate five different kinds of associates in a game-like, non-evaluational context. Tests of intelligence, scholastic aptitude, and achievement were also administered to assess the traditionally demarcated area of general intelligence.

The creativity indicators proved highly reliable and highly intercorrelated, as did the intelligence measures. The correlation between the creativity and intelligence measures, however, proved to be extremely low.

The intelligence and creativity dimensions were studied through observations based on disruptive attention-seeking behavior, social relationships with peers, self-confidence, interest in and attention span for work, etc. Analyses were made for four groups: those high in both creativity and intelligence, those high in one and low in the other, and those low in both.

A further study of conceptualizing activities categorized

CHARACTERISTICS OF THE CREATIVE PERSON
(continued)

responses as physical-descriptive, conceptual-inferential, and thematic.

Data were also gathered on sensitivity to the expressive potential of visual materials and on the children's descriptions of themselves with respect to general anxiety symptoms and symptoms experienced under the stress of examinations.

M. A. Wallach and N. Kogan RM 64-11; published in Journal of Personality, 1965, 33, 348-369.

The Person, the Product, and the Response: Conceptual Problems in the Assessment of Creativity

The authors suggest that three criteria of creativeness--unusualness, appropriateness, and transformation--may evoke three corresponding types of esthetic response--surprise, satisfaction, and stimulation. A fourth criterion, condensation, is needed for those products that do not divulge their total meaning on first viewing, and an appraisal of summary power (multiplicity of interpretation) provides an important judgmental standard for the evaluation of creative condensation. In reaction to condensation, responses to unusualness, appropriateness, and transformation are enduring and somewhat intensified. Surprise recurs, satisfaction deepens, and stimulation is enriched.

The producer of unusual responses is described as highly original; the producer of an appropriate response as highly sensitive; the producer of transformations as flexible; and the word that best describes the producer of condensations is poetic.

The authors present their theories in tabular form, suggesting both an elaboration of this outline and the necessity for empirical studies to give weight to their theoretical approach.

S. Messick and P. W. Jackson
RB 64-57; published in Journal of Personality,
1965, 33, 309-329.

Measuring Artistic Creativity and Flexibility

The purpose of this study was to examine the relationship between flexibility and artistic ability. To achieve this end, 92 students at a school of design were asked to draw the same

CHARACTERISTICS
OF THE CREATIVE
PERSON
(continued)

thing twice, once using one mode of organization and again using an opposite mode.

The rated dissimilarity between each student's drawings provided a behavioral measure of flexibility. The students also took three tests that supposedly measured various facets of flexibility. Indices of artistic ability included grades in fine arts courses and the rated quality of the students' drawings in both modes and on a drawing problem assigned earlier in the semester.

The results indicated that only the behavioral measure of flexibility was positively related to indices of artistic ability. The implications of these findings are discussed.

S. P. Klein, R. W. Skager, and W. Erlebacher
RB 66-27; published in Journal of Educational
Measurement, 1966, 3, 276-286.

Creative Ability and Risk Taking in Elementary School
Children

This study explored the interrelationships among selected measures of creativity, intelligence, and risk-taking in a sample of 162 fifth-grade children, 84 boys and 78 girls. Creative ability was measured by two of the procedures developed by Wallach and Kogan -- Alternate Uses and Pattern Meanings; intellectual ability was measured by the California Test of Mental Maturity; risk-taking was measured by McClelland's Draw-a-Circle and two tasks developed by Kogan and Wallach -- Clues and Shuffleboard; and anxiety and defensiveness were measured by scales adapted from the work of Sarason and his associates.

Significant relationships were obtained for boys, between the number of associates generated in the creativity tasks administered under game-like conditions and the preferred level of risk-taking on the shuffleboard task. The IQ index, unrelated to creative ability, showed a marginal association with risk-taking. Interpretation of the creativity-risk-taking relationship invoked self-confidence as a possible mediating link. Consistent with that interpretation, the foregoing relationship was not found in high defensive boys but was significant and quite substantial in low defensive boys.

Ethel Pankove and N. Kogan
RB 67-40; published in Journal of Personality,
1968, 36, 420-439.

CHARACTERISTICS OF THE CREATIVE PERSON
(continued)

Motivation and Capacity in Children's Creativity

An attempt was made to distinguish between capacity and motivational interpretations of individual differences in children's creativity. Creativity tasks required the child to name as many ideas as he could that met a simple problem requirement. Tasks were given under "base line" conditions and with a reward of one cent for each idea given. If task motivation is the critical determinant of performance, reward should decrease the differences between high- and low-scorers by decreasing the range of motivation with which the task is approached. However, if these individual differences reflect capacity, reward should increase or leave unchanged the difference in number of ideas given by more and less fluent children.

Reward led to an increase in mean number of ideas which was consistent across levels of creativity. Thus, while motivating conditions may alter the level at which the group performs, the data suggest that individual differences in performance derive from differences in capacity rather than motivation for divergent ideational production.

W. C. Ward, N. Kogan, and E. Pankove
RB 70-39

Multiple-Choice Questions and Student Characteristics

In addition to reviewing previous attempts to examine the criticism that multiple-choice aptitude and achievement questions penalize the highly able student and reward the less able one, this paper presents original research which explored relationships between performance on multiple-choice questions and the characteristics which critics have suggested differentiate students who are rewarded from those who are penalized.

The subjects were 108 undergraduate males. The characteristics studied were: creativity, nonconformity, ability to recognize ambiguity, preference for complexity, and test-wiseness.

Analyses of the data for the total group of subjects and for various subgroups revealed that the results frequently neither simply supported nor rejected the critics' claims, but

CHARACTERISTICS OF THE CREATIVE PERSON introduced complexities which have heretofore not been considered by the critics.

(continued) H. A. Alker, Julia A. Carlson, and Margaret G. Hermann
RB 67-52; published in Journal of Educational Psychology, 1969, 60, 231-243.

Rate and Uniqueness in Children's Creative Responding

Three ideational fluency measures were administered to 34 seven- and eight-year-old boys. Response rate and uncommonness were compared with results from published studies using college students as subjects. In agreement with earlier findings, response rate decreased, and average uncommonness of responses increased, over time; subjects who eventually produced more ideas gave them at a higher rate. Creative children (those having high response fluency) did not differ from uncreative ones either in their proportion of uncommon responses throughout the task or in the rate at which their successive responses became less stereotyped. The possibility was raised that children identified as creative differ from others solely in personality and motivational characteristics, rather than in ability characteristics.

W. C. Ward
RB 68-36; published in Child Development, 1969, 40, 870-878.

PREDICTION OF CREATIVITY

Comparison of Information Scales and Like-Indifferent-Dislike Scales as Measures of Interest

The potential of information tests for non-fakable measurement of interests was tested by observing the overlap of interest scales with information scales after partialling out verbal and numerical ability as measured by the Preliminary Scholastic Aptitude Test. An interest scale -- the Cooperative Interest Index (CII) -- and an information scale -- the Test of General Information (TGI) -- were therefore administered to 261 male and 263 female "college-bound" high school juniors in seven eastern high schools.

Significant partial correlations between the CII and the TGI led to a comparison of the respective capacities of the two instruments in predicting academic performance, as expressed in grade-point averages, and self-initiated extracurricular accomplishments in the arts and sciences as indicated by responses on the Independent Activities Questionnaire (IAQ).

While the interest scales predicted academic performance independently of measured aptitude for males, the information scales were not related to grades for either sex after partialling out verbal and numerical abilities. In correlations with self-initiated extracurricular science, esthetic and literary activities, interest scales did show larger and more consistent relationships than information scales, but the presence of interest components in information scales seems to have been established.

R. W. Skager, Anne M. Bussis, and C. B. Schultz
RB 63-10

Life History and Ability Correlates of Mechanical Ingenuity

This study examined the predictive validity of certain tests of mechanical ingenuity as well as the concurrent validity of various measures of interest, backgrounds, and personality dimensions thought to be related to scientific creativity. The 528 subjects used for this purpose were a group of engineers who had been enrolled in mechanical engineering curricula at the time of testing, but were currently engaged in research, design, or development.

Predictive validities of .23 to .35 were obtained with a content-relevant ability measure against a weighted composite criterion made up of patents, publications, etc.; but when scores from this test were placed in a regression equation

PREDICTION
OF CREATIVITY
(continued)

along with concurrently validated scales from a life history questionnaire, the correlation between the regression scores and the criterion ranged from .41 to .69. The factorial scales that made the major contributions to this prediction were designated as drive, independence, research orientation, and positive home and educational background.

These findings, along with the skewness of the criterion scores, supported the general position that a creative act is not a function of a single trait or ability, but is a phenomenon (or an event) that is probably based on a series of relatively independent types of variables.

S. P. Klein and W. A. Owens, Jr.
RB 65-18

The Prediction of Academic Success and the Ability to Draw at a School of Design

This research was concerned with the admission of students to a selective school of design. Three issues were raised: 1) interrelationships among various criteria, including academic performance in liberal arts, art, and architecture courses, as well as performance in problems in esthetic drawing assigned as a part of the research; 2) prediction of these criteria by means of measures of aptitude, history, and personality; and 3) the use of such predictors along with other types of information in the admissions process.

Research conducted over a two-year period on two successive classes of students indicated that art and design criteria bore little relationship to performance in liberal arts. However, it was possible to predict academic criteria including a complex measure of performance in liberal arts and design courses. In contrast, predictions of performance in drawing did not hold in cross-validation, although this observation may in part be due to differences in the drawing problems assigned to the two groups. Measures of visualization and figural redefinition appeared promising for the prediction of performance in design fields, while measures of academic aptitude, verbal abilities (both convergent and divergent), and personality (with the exception of independence and self-ratings of creativity) in most cases did not relate consistently to the criteria studies.

R. W. Skager, S. P. Klein, and C. B. Schultz
RB 66-5; published in Journal of Educational Measurement, 1967, 4, 105-117.

PREDICTION
OF CREATIVITY
(continued)

The Prediction of Performance in Independent Secondary Schools

The purpose of this research was to examine the effectiveness of various types of tests for the prediction of performance in independent secondary schools. Specifically, the research was designed to examine the effectiveness of tests of general information and tests of achievement when used alone or in conjunction with aptitude measures similar to those used in the Secondary School Admissions Test program for the prediction of performance in school.

The Sequential Tests of Educational Progress (STEP), the School and College Ability Test (SCAT), the Test of General Information (TGI), and the Background and Experience Questionnaire (BEQ), which were administered in the ninth-grade, served as the predictors. The Independent Activities Questionnaire, administered in the 12th grade, and designed to measure creative performance, was used as one of the criteria because it was expected to measure something not measured in senior rank-in-class which was the other criterion.

The BEQ proved of little value for the prediction of 12th-grade performance, but the TGI, SCAT, and STEP showed moderate to strong relationships. The use of "step-wise multiple regression" to select the best sets of predictors for the total score on the IAQ and senior rank-in-class yielded the following results: 1) When predictors of rank-in-class were chosen freely, the aptitude (SCAT) or achievement measure (STEP) was generally chosen first, but in all six schools and in the total group at least one TGI score was among the four best predictors; 2) when predictors of the IAQ Total score were chosen freely, TGI scores appeared frequently in the set of the four best predictors; 3) when scores comparable to those in the SSAT program were arbitrarily chosen as the first three predictors and the fourth was chosen freely, that fourth variable was more often a STEP than a TGI score; 4) when the first three predictors were the scores most similar to the present SSAT scores, the fourth predictor chosen was a TGI score in six out of seven cases; and 5) in the prediction of rank-in-class and the IAQ Total score, TGI scores were almost always in the sets of the four best predictors.

T. Anne Cleary
Secondary School Admission Test Program, Report
IX, September 1966

PREDICTION
OF CREATIVITY
(continued)

An Examination of the Validity of Nine Experimental Tests
For Predicting Success in Law School

This study examined whether any of nine experimental tests could be combined with undergraduate grade-point average and the Law School Admission Test to improve the predication of first-year grades in law school. The student's Undergraduate Grade-Point Average (UGPA) and his scores on the following were used as the "standard" predictors: Law School Admission Test (LSAT); Writing Ability Test (WA); and General Background Test (GB). The experimental tests were chosen on the basis that 1) they appeared to measure intellectual abilities related to law school success that were not being measured by LSAT or UGPA, and 2) they had not been tried out against the criterion of law school grades.

The results for the 1081 first-year students in seven law schools indicate that the best predictor of the first-year law school grade-point average were the LSAT and the UGPA. The analyses of the results of the experimental tests indicated that only the "acceptable" score on the Formulating Hypotheses Test had some potential for increasing validity.

S. P. Klein and F. R. Evans
RM 68-3; published in Educational and
Psychological Measurement, 1968, 28, 909-913.

Early Predictors of Later Creative Achievements

Early predictors of later creative achievements were examined in this study. Predictor data (academic skills and past creative achievements) were obtained in 7th and 9th grade on 2337 students. The Independent Activities Questionnaire was administered to these students in the 12th grade and the results were used as the criterion data.

Correlational analyses indicated: 1) the best predictors of creative achievements were past creative accomplishments; 2) 7th-grade academic skills also correlated significantly with the criteria; 3) the combination of past achievements and academic skills predicted the criteria between .40 and .50; and 4) the particular criterion area (e.g., science vs. art) and the student's sex moderated the magnitude of the foregoing relationships.

S. P. Klein and F. R. Evans
Paper presented at American Psychological
Association meeting, Washington, D. C., 1969.

PREDICTION
OF CREATIVITY
(continued)

Predicting Multiple Criteria of Creative Achievements With
Moderator Variables

A moderated regression technique was applied to two samples of males and females for each of which there was multiple predictor, moderator, and criterion information. One moderator was found that consistently identified a group of predictable individuals independent of both sex and the three creative achievement criteria. This moderator was a modification of the Drews sociability scale. It indicated that those individuals who had little or no inclination towards social functions tended to be considerably more predictable than the remainder of the sample or the group taken as a whole. Within the low social groups, girls appeared to be somewhat more predictable than boys on two of the three creative achievement criteria; however, the greatest discrepancy appeared in the writing criterion, where the girls were substantially more predictable. Finally, the low sociability groups were characterized by greater predictive accuracy regardless of whether "tailored" or overall prediction equations were used.

D. A. Rock, F. R. Evans, and S. P. Klein
RB 69-34

CORRELATES OF
CREATIVITY

Relationship of an Independent Activities Questionnaire
to Performance During High School

This project was concerned with the development of an instrument for obtaining reports of high-level achievements in self-initiated activities during the high school years. Three kinds of scores on the Independent Activities Questionnaire (IAQ), were examined: 1) total number of items checked -- an indication of the extent to which students engage in outstanding activities in general; 2) three a priori scales covering scientific, esthetic, and literary activities; and 3) Single Outstanding Activity. These scores were correlated with total grade-point averages and specific averages in English and Language, Mathematics and Science, and Social Studies and Humanities; the scores on the Verbal and Math Sections of the Preliminary Scholastic Aptitude Test; Concealed Figures; the test of General Information; and the Cooperative Interest Index.

An analysis of the results for the 261 boys and 263 girls, who were taking college preparatory courses in six public high schools, yielded intercorrelations among the various scores on the IAQ that were significantly different from zero. Total Score, outstandingness of the "best" activity of each subject, and subscores for the three content areas on the IAQ were found to be substantially related to ability, interests, and achievement. The highest correlations for the independent activities measures were with interests.

C. B. Schultz and R. W. Skager
RB 63-16

Concepts and Applications in the Measurement of Creativity

A discussion of creativity as an achievement and as a trait introduces the Independent Activities Questionnaire (IAQ), a measure designed to obtain evidence of unusual accomplishments at the secondary school level. The theoretical assumptions underlying the development of the instrument, its content, and the results of item and test analyses are reported.

C. B. Schultz and R. W. Skager
RM 63-17
Paper presented at American Psychological
Association meeting, Philadelphia,
Pennsylvania, September 2, 1963.

CORRELATES OF
CREATIVITY
(continued)

Nonintellective Correlates of Secondary School Achievement

The research reported here represents an attempt to isolate biographical and attitudinal correlates of achievement after controlling for aptitude. Two biographical inventories pertaining to academic aspirations and plans, extracurricular activities and jobs, pressures and values in the home and peer group, and self-initiated efforts to achieve various personal goals were administered to approximately 750 college preparatory 11th-grade students in seven northeastern public secondary schools. The responses to the inventories were correlated with a residual grade average reflecting academic achievement independent of aptitude as measured by the Preliminary Scholastic Aptitude Test.

The results are generally consistent with the findings of previous investigations. Attributes found to be positively related to the criterion of achievement include: high academic aspirations, plans to continue education beyond four years of college, a home and peer environment which encourages academic goals and general intellectual pursuits, and self-initiated efforts to achieve goals of an intellectual nature.

R. W. Skager and J. Terwilliger
RB 64-16

Quality and Quantity of Accomplishments as Measures of Creativity

A revised Independent Activities Questionnaire (IAQ), composed of items describing achievements of a creative type, was developed for use as a criterion instrument in this research study. The items were scored for the number of accomplishments (Quantity) and for the level of a single most outstanding accomplishment (Quality). These scores were correlated with other variables (socioeconomic status, "discussions," high-school rank, and V and M scores on the Scholastic Aptitude Test).

Correlations of the scores of a sample of 292 entering college freshmen indicated that 1) Quality and Quantity scores were significantly correlated, but that 2) Quality was more related to a measure of academic aptitude, and 3) Quantity was more related to a measure of intellectual stimulation in the home.

R. W. Skager, C. B. Schultz, and S. P. Klein
RB 64-31; published in Journal of Educational Psychology, 1965, 56, 31-39.

CORRELATES OF
CREATIVITY
(continued)

A Plan For Evaluating the Quality of Educational Programs
in Pennsylvania

One of the goals of education which the State Board and educational leaders in the Commonwealth of Pennsylvania considered to be of primary importance was that "Quality education should give every child the opportunity and encouragement to be creative in one or more fields of human endeavor." The research described in this report was undertaken to determine the validity and practical utility of the Independent Activities Questionnaire (IAQ) as a measure of creative achievement.

The IAQ, together with a number of other instruments, was given to over 1,700 high school seniors in 12 school districts in Pennsylvania. The schools selected represented the full range of socioeconomic levels, community size, and school size. The other measures were so chosen as to permit the checking of the major hypotheses regarding creativity.

The analyses of the data indicated that the IAQ appeared adequately valid and appropriate for general use in the high schools of Pennsylvania.

The study produced certain substantive findings about the number and quality of creative activities in which the children engage. One such finding suggests that neither the size of the community nor the size of the school has any impact on the IAQ scores of boys. The IAQ scores of girls, however, do appear to be influenced by the size of the school they attend. That is, the number and quality of creative activities in which girls from large high schools engage are significantly greater than the number and quality of creative activities in which girls from small high schools engage. This result appears to hold up irrespective of the general economic level of the groups considered. Perhaps this effect is not produced by the sheer size of the school but by the fact that the larger high schools are better able to provide for the kinds of activities (art clubs, etc.) that give girls an opportunity to express their creative interests.

S. P. Klein and R. W. Skager
June 30, 1965
Available from Severino Stefanon, Secretary
State Board of Education
333 Education Building
Harrisburg, Pennsylvania 17126

CORRELATES OF
CREATIVITY
(continued)

A Description of the Independent Activities Questionnaire

The content, statistical properties, and possible uses of the Independent Activities Questionnaire are the subject of this paper. It also provides a bibliography of research studies in which this instrument was used.

S. P. Klein
RM 67-14

Cognitive and Non-Cognitive Correlates of Creative Achievements

Three research studies that employed the Independent Activities Questionnaire are reported in this paper. The results of these studies consistently indicate positive correlations between a variety of indices of intellectual and academic ability and creative achievements. The fact that these findings are in contrast with those of other investigators may be due to the instrument itself, which has greater control on student honesty and takes into consideration the quality and quantity of a student's achievements in many different areas.

S. P. Klein and R. W. Skager
Paper presented at the American Educational
Research Association meeting, New York,
February 18, 1967.

For other studies using the Independent Activities
Questionnaire, see:

The Prediction of Performance in Independent Secondary
Schools, page 21.

Early Predictors of Later Creative Achievements, page 22.

STUDIES IN PROGRESS

Creativity and Classroom Behavior

An exploratory attempt will be made to discover whether there are identifiable child behaviors in the classroom which are associated with creativity test performance. Seven fourth-, fifth-, and sixth-grade classes in one elementary school will be observed, using a modification of Medley's OSCAR 5-V schedule. Modification is intended to provide identification of children with particular behaviors in the classroom, and to allow finer discrimination of categories which appear to be relevant to the divergent-convergent performance distinction. Creativity will be assessed using two ideational fluency measures modified from those introduced by Wallach and Kogan; measures will be obtained to allow some estimation of the change and reliability of creativity over the school year.

An attempt will also be made to discover whether classrooms can be differentiated on a dimension of convergent vs. divergent emphasis in teacher style, and whether, at least within some range on this continuum, the child's creativity is predictive of academic achievement.

W. C. Ward

Disadvantaged Children and Their First School Experiences:
ETS-Head Start Longitudinal Study: Children's Drawings

This investigation involves the use of three types of standard stimuli for art production: visual, aural, and kinesthetic. All subjects are asked to draw a picture of themselves and to draw a second picture in response to the stimulus motivation. The drawings will be subjected to a content analysis and, in addition, a method of statistical analysis is being explored for the identification of original drawings motivated by the standard stimuli.

Sandra Landes
PR 68-4

STUDIES IN PROGRESS (continued)

Evaluating Sesame Street

Sesame Street has, as one of its goals, developing in children the ability to generate explanations and solutions to problems. A test of this goal will probably be included as part of the posttest battery. It is realized that the generation of explanations and solutions is, at least, a part of the creative process.

S. Ball, R. Creech, and Gerry Bogatz

Incidental Learning and Creativity in Children

Several studies with adults have shown a positive association between creativity and learning of incidental material. This study will attempt to discover whether a similar association can be found in elementary school children.

Approximately 200 children in grades 4-6 will be given two creativity tests, modified from the ideational fluency measures introduced by Wallach and Kogan. Four groups of 20 children each will be chosen, representing the four combinations of high and low IQ with high and low creativity levels. They will be given a learning task developed by Hagen, with both immediate and delayed tests for recall of incidental information. The latter variation will allow some assessment of whether differences in incidental learning can be attributed primarily to differential encoding of nonfocal material or primarily to differential availability for recall.

Intervening between the assessments of incidental learning will be a brief version of the Remote Associates Test, the measure of creativity which has generally been employed in the related studies with adults. In view of the recent suggestion that the Remote Associates Test is not related to the ideational fluency measures, it will be of interest to examine the interrelations of these two creativity measures and any differences in their relations to focal and incidental learning.

W. C. Ward

STUDIES IN PROGRESS
(continued)

Sex Differences in Cognitive and Personality Structure

This study investigates the nature and generality of cognitive styles, with particular emphasis upon 1) an evaluation of sex differences in the psychological organization of cognition and personality; 2) an appraisal of the number and nature of primary dimensions necessary to account for previously observed stylistic consistencies in cognition; and 3) an investigation of the interrelations of these stylistic dimensions with measures of intellectual ability, attitude and belief structures, affect expression and control, personality, and academic and creative achievement.

A battery of experimental cognitive, personality, and life-history measures which required over 20 hours of testing time was administered to more than 700 high school juniors and seniors over a two-month period. The battery included several measures of a number of cognitive styles as well as measures of closely related dimensions of intellectual functioning. Among the style-related measures were several bearing on aspects of creativity such as measures of fluency, divergence, flexibility, and originality. To appraise the relation of cognitive styles and personality to academic and creative achievement, a detailed questionnaire was administered to assess the type, level of involvement, and originality of the individual's participation in extracurricular science projects, creative writing, art, music, public affairs, and other independent creative activities.

S. Messick and D. Dermen

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